February — March 1974

EMO

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In addition to publishing articles which reflect Canadian Government policy the Digest may also publish articles by private individuals on subjects of current interest to the emergency measures programme. The views of these contributors are not necessarily subscribed to by the Federal Government.

Editor: A. M. STIRTON

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CIVIL EMERGENCY PLANNING IN NORWAY

by
*F. Valeur**
Director of Civil Defense, Norway

The main tasks of civil emergency planning in Norway are to maintain governmental control; to maintain the lives, health, working capability and defence will of the population; to provide the necessary logistic support for the total defence; to secure economical use of available resources, and to reduce and make good the effects of enemy actions against civil targets.

It is worth noting that the above tasks include some which in other countries belong to the military field of responsibilities, in particular regarding logistics.

As a general rule, each ministry and other governmental agency is responsible for civil emergency planning in peacetime and execution of plans in a crisis and in war within its own field. The wartime organization is built on the peacetime administration, suitably adapted and relocated as required.

The responsibility for overall coordination is vested in the Directorate of Civil Defence and Emergency Planning.

A number of boards and committees have been established to ensure proper coordination and to give advice to the responsible administration. These are shown at Figure 1.

The Directorate of Civil Defence and Emergency Planning

(Direktoratet for sivilt beredskap — DSB) is responsible for co-ordination of civil emergency planning and for all aspects of civil defence proper. In civil emergency matters it is entitled to deal directly with all ministries and other civil and military authorities. All governmental agencies are bound to assist the directorate as required, including giving any information requested, and, by agreement to produce personnel for carrying out emergency planning tasks, courses and training.

Central level	**Secretariat**
Coordinating Council for Civil Emergency Planning	Directorate of Civil Defence and Emergency Planning
Transport Preparedness Board	Emergency Planning Branch/Ministry of Transport
Industrial Preparedness Committee with subcommittees for each industrial branch	Emergency Planning Branch/Ministry of Industries
POL Emergency Board	Emergency Planning Department/Ministry of Commerce
Manpower Emergency Board	Emergency Planning Branch/Directorate of Labour
Health Emergency Board	Directorate of Public Health
Shipping Emergency Board	Emergency Planning Secretariat/ Norwegian Shipowners Association
Civil Defence Council	Directorate of Civil Defence and Emergency Planning
Norwegian War Damage Board	Ministry of Social Affairs
Emergency Planning Committee for the Governmental Press Service in War	Prime Minister's Office
Regional level	**Secretariat**
Regional Emergency Planning Council	Emergency Planning Branch/ Regional County Governor's Office
Regional Planning Committee for the Governmental Press Service in War	Emergency Planning Branch/ Regional County Governor's Office
County level	**Secretariat**
County Emergency Planning Council	Emergency Planning Branch/County Governor's Office
County Planning Committee for the Governmental Press Service in War	Emergency Planning Branch/County Governor's Office

FIGURE 1

*Mr. Valeur was formerly Chairman, Civil Communication Planning Committee for NATO.

The directorate issues — in cooperation with the appropriate ministry — technical directives related to the civil emergency planning activities of the county governors and the municipalities. It directs all civil defence units.

The directorate shall, in concert with the Coordinating Council for Civil Emergency Planning, develop common guidelines for and conduct the central coordination of the civil emergency planning, including to

- make proposals for directives and measures aiming at facilitating the continuance of the civil administration in an emergency and in war
- develop general planning directives, long term plans and budgets etc.
- develop a civil alert measures plan and keep it up to date
- as required take initiative to and give directives for the planning in the different fields and as required decide on assumptions, deadlines and priorities
- propose that emergency planning should be taken up in new fields and who should be responsible
- monitor the emergency planning in the different sectors and control that plans and measures are adequately fit to the total defence preparedness of the country.

In supervising the administrative emergency planning the directorate shall also act as a service body for ministries and other authorities. In this connection it shall ensure that the plans of the ministries and their subordinate bodies are properly coordinated and in accordance with the civil alert measures plan.

The directorate executes the supreme command of the civil defence organization and is responsible for ensuring that it is able it meet its responsibilities, including to make sure that

- all plans for the civil defence activities are developed and kept up to date and that measures are taken to ensure that the plans can be carried out without delay
- the Ministry of Justice is informed of all matters which could make the civil defence organization modern and effective
- establishments, material and equipment is sufficient and modern, and that it is adequately located
- all personnel receive the best possible training.

The directorate is responsible for the preparation of communications for the civil wartime organization and cooperates in this connection with the Telecommunications Administration and the Chief of Defence.

The directorate shall inform the population of the civil emergency planning and give guidance on how the population can protect itself in wartime.

In cooperation with the appropriate authorities the directorate shall develop guidelines for the training and exercise activities within the civil emergency field. It is responsible for coordination and execution of exercises comprising several emergency fields and shall conduct or cooperate in courses and exercises for technical education of personnel with emergency tasks at central, regional and local level.

The directorate conducts the construction of its own establishments and of establishments for the civil wartime organization as agreed. It supervises the construction of public and private shelters.

The directorate shall see to it that emergency requirements are taken into account in regional planning, district development and development of communications.

The directorate is responsible for the operation of the Government's War Headquarters, and, together with the Chief of Defence, for its situation centre, briefs, reporting systems etc.

At regional level

The coordination of civil emergency planning in peacetime is carried out by one of the county governors in each of the 5 regions. These regional county governors have within their staffs a special regional civil emergency planning branch.

At county level

The coordination is carried out by the county governors of each of the 18 counties. Within their staffs there is a special county civil emergency planning branch.

In wartime

The regional commissioners (who are appointed in peacetime and could be the regional county governors) take over the overall responsibility. They represent the government and are entitled to give directives to the county governors and all other authorities in the region. At county level the county governors have similar responsibilities and powers in wartime.

The civil defence organization

It comprises 4 (in wartime 5) Civil Defence Regions, 53 Civil Defence Sub-regions, 124 Local Civil Defence Areas, 14 Mobile Columns, The Civil Defence College and 3 regional schools. In addition, all industrial enterprises with more than 40 employees have their own civil defence organization, financed by the enterprise. A similar civil defence organization exists within the Norwegian State Railways.

The Prime Minister's Office is responsible for emergency planning in the *information* field, assisted by the Directorate of Civil Defence and Emergency Planning. The wartime organization consists of a news centre and press officers connected to the staffs of the regional commissioners and the county governors. The personnel are drawn from the press, the Norwegian News Agency and the Norwegian State Broadcasting, which are actively participating in the peacetime planning.

The Directorate of Public Health (in the Ministry of Social Affairs) and the chief medical officers in the

(continued on page 5) **CIVIL**

CIVIL DEFENCE WARNING AND ALARM – GERMANY

The organization and mission of the Civil Defence Warning Service and its local Alarm Services in the Federal Republic of Germany are governed by the 1st Law concerning Measures for the Protection of the Civil Population dated 9th October 1957. The Warning and Alarm Service is dealt with by the Federal Office of Civil Defence, this being a major federal authority under the jurisdiction of the Federal Ministry of the Interior.

In the event of war the Warning and Alarm Service has the following tasks:

- Public warning to the population by air raid sirens in cases of imminent danger of air raids or attacks by long range weapons as well as radioactive fall-out, biological or chemical attacks.
- Sounding an All Clear Signal to the public by air raid sirens at the end of an immediate danger period.
- Transmission of current reports on the air situation and the NBC situation (nuclear, biological, chemical) for authorities and enterprises performing vital tasks for the life and defence of the people.
- Transmission of reports to the federal government and to the neighbouring NATO countries (Exchange information above all in case of NBC Warfare).

When planning an appropriate Warning and Alarm Service meeting these requirements it was necessary to take into account that modern aircraft, as well as unmanned aerodynamic and ballistic missiles are very fast and in particular, that in the event of a war the Federal Republic of Germany could be very close to a potential front line.

The territory of the Federal Republic of Germany is divided into 10 Warning Areas each with its own Warning Centre. (Figure 1) In most cases the border lines of these warning areas coincide with the borders of the individual Federal States. Within each warning area correct functioning of the warning service is the responsibility of the Warning Centre's Director. He will base his decisions and warning measures on information as shown by the air situation map, and the map displaying the NBC situation in the operations room. The reports required to update the information on these maps are conveyed to the Warning Centre from various sources.

For transmission of reports on the air situation there are Civil Defence Liaison Cells with Civil Warning Officers in the air defence control centres of the NATO Air Force. It is the task of the Liaison Officers in these centres to continuously watch and report the air situation displayed there on radar scopes. They evaluate the air situation with regard to the Civil Defence Warning Service in case of need they make current reports to the Warning Centres using direct communication lines. The same procedure applies when information in the event of NBC means of warfare is received in the air defence control centre.

In order to collect NBC reports from civilian sources monitoring posts are erected at distances of 10 - 15 km over the whole territory of the Federal Republic. Approx. 25 such posts are connected to one NBC Filter Centre. Within each of the 10 Warning Areas there are 4 to 5 NBC Filter Centres; these transmit their

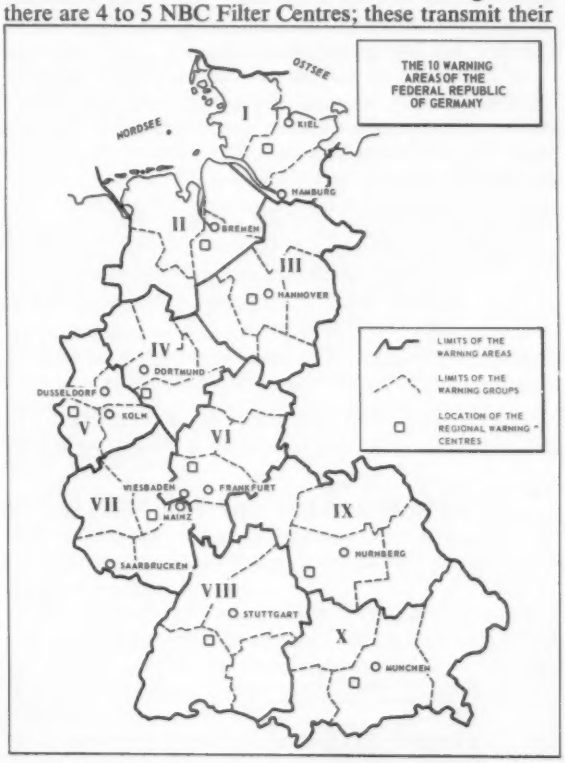


FIGURE 1

own findings as well as reports of the monitoring posts, after an appropriate check, immediately to the Warning Centre. First reports on NBC means of warfare are of particular importance.

The monitoring posts and the NBC Filter Centres are equipped with special detectors and instruments for the measuring of radioactivity, i.e. dose rate meters.

From a study of the overall picture of the air and NBC situation taking shape and being displayed on the big maps in the operations room, the Warning Centre's Director will make his decision whether or not, and if so, at what time, an alarm will be sounded. In order to give an alarm to the public in the first place, stationary sirens are used i.e. sirens mounted on roofs or masts and driven by electric current or compressed air. So far a total number of approx. 60 000 sirens have been erected in the territory of the German Federal Republic.

The sirens can be actuated centrally from the regional Warning Centres for their respective areas. Alternatively each centre can warn smaller parts of its area i.e. sub

areas (the so-called warning groups). For the activation of sirens, a great number of telephone lines have been routed and earmarked by the German Bundespost (Federal Postal Service) to establish the warning network. In addition to the necessity to actuate all sirens by the Warning Centre concerned, special cases may require operation by the local Civil Defence Chief, for example when long distance control lines fail or when local attacks involve smaller areas only. This local actuation of sirens is effected by means of a remote control device connected to the warning network.

In the event of failure of electric power or other incident, mobile air raid sirens and makeshift alarm devices (loudspeakers, factory hooters and the like) are used. The following signals are sounded by permanent and mobile air raid sirens:

Air Raid Alarm: 1 minute warbling tone

NBC Alarm (Alarm in case of NBC attacks): 1 minute warbling tone interrupted twice, after a 30 seconds' break again 1 minute warbling tone interrupted twice

All Clear Signal (End of danger after air raid or NBC Alarm): 1 minute steady tone

The erection of air raid sirens in each locality is the duty of the local community which is obliged by law to take necessary steps for the erection and maintenance of air raid sirens, the costs being borne by the Federal Government.

At a half-yearly intervals all sirens are actuated in order to test their correct functioning and the warning network. In order to have another means of alerting the public, appropriate arrangements have been made to enable the Warning Centres immediately to inform the public over the Broadcasting Network.

As mentioned at the beginning, the Warning Service, in addition to its mission to alert the whole population, has another mission, that is to give current information on the air and NBC situation to authorities and important installations performing vital tasks, essential for the life and defence of the people. All these organizations are connected to their respective regional Warning Centre and designated *Warning Reception Points.* Among these are the Headquarters of Civil Defence and Police, installations for supply of water, electricity and gas, organizations for the production of food, traffic agencies and the like. The reports from Warning Centres enable the Warning Reception Points to take individual precautionary measures prior to public alarm or all clear signal.

The transmission of the reports of the warning centres to the warning recipients is done through the telephone

WARNING AND ALARM SERVICE OF THE GERMAN FEDERAL REPUBLIC

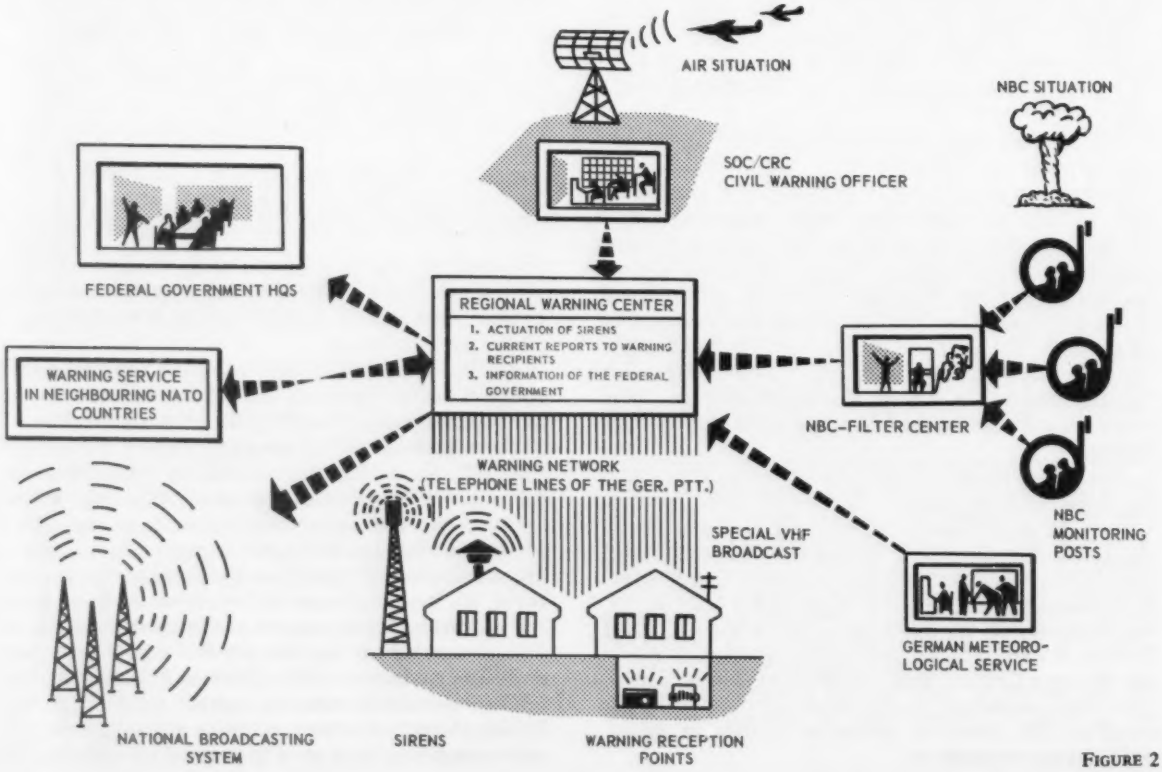


FIGURE 2

lines of the warning network. Up to now all over the Federal Republic approximately 13,000 Warning Reception Points have been connected to the warning network. For the reception of the reports special telephone sets with loudspeakers are available. It is planned in future to transmit the reports also by VHF radio using a number of small broadcasting stations of the German PTT. For this wireless reception battery-operated receivers (transistor equipped) will be required.

All 10 Warning Centres of the German Federal Republic are operational. They are established in underground shelter installations at some distance from towns and constructed in such a way as to enable personnel to work for some period of time independent of the outside world.

There are practice operations on several days every month to train full-time staffs and voluntary helpers of the warning service and to check the telecommunication lines. In addition warning exercises on a national and in the framework of NATO on an international basis are held every year.

A description of the establishment and functions of the Civil Defence Warning and Alarm Service is shown at Figure 2. ▲

CIVIL *(continued from page 2)*

counties are responsible for emergency planning and preparations for *the health services*, including the augmentation of hospital capacity.

The Ministry of Justice and the 53 Chief Constables are responsible for emergency planning and preparations for the police, including training of the police augmentation forces.

Economic war preparedness
(resources management)

In this field, the tasks are divided among the different ministries and their subordinate bodies. Overall coordination is carried out by the Directorate of Civil Defence and Emergency Planning, the regional county governors, the county governors and the mayors at central, regional, county and local levels respectively.

The *Ministry of Transport* is responsible for emergency planning and preparations for inland transport, ports and communications. In the transport field the chief traffic officers in the counties, assisted by their emergency planning officers, are responsible for detailed planning. The wartime organization consists of a main transport centre and regional and county trasport centres as well as local bodies. The personnel are drawn from the peacetime administration and from the transport branches.

In the telecommunications field the Telecommunications Administration, which will continue largely unchanged in war time, is responsible for detailed emergency planning and preparations.

The *Ministry of Commerce and Shipping* is responsible for emergency planning and preparations for supplies, foreign trade and shipping. In the supplies field each county and each municipality have their supplies agencies, which will be reinforced in a crisis.

The wartime organization also includes POL (petrol, oils lubricants) centres, largely organized in the same way as the transport organization and manned by personnel drawn from the oil industry, and NORTRASHIP with a number of branch abroad, responsible for operating the merchant fleet and manned by personnel drawn from the shipping companies.

The Ministry will also set up the Directorate of Foreign Trade, which, under the direction of the Cabinet and the Ministry, will be responsible for dealing with the CSA (Central Supplies Agency) and the ESA (Emergency Supplies Agency).

The *Ministry of Industries* is responsible for emergency planning and preparations for the industries and the power supply. The wartime organization includes regional and county industrial officers, drawn from the industry.

In power supplies field the normal governmental and county organization, which will largely be maintained unchanged in wartime, is responsible for detailed planning and preparations.

The *Ministry of Labour*, the Directorate of Labour, the County Labour Offices and their subordinate local bodies are responsible for emergency manpower planning. This organization will be maintained in wartime, largely unchanged.

Also other ministries and their subordinate bodies have responsibilities in the resources management field. ▲

THE DISASTER SERVICES ACT – ALBERTA

An Introduction to the Disaster Services Act (1973) of the Province of Alberta

by
J. Rick Ponting, Ph.D.
Assistant Professor of Sociology, The University of Calgary, and Former C.E.M.O. Fellow to The Disaster Research Center, Ohio State University

After months of public discussion meetings throughout the province and considerable debate in the legislature, on October 30, 1973 Alberta's new Disaster Services Act was finally enacted into law. The Act, which supersedes all previous disaster legislation in the province, formalized the trend away from preparedness for wartime disaster toward preparedness for — and prevention of — peacetime disasters and emergencies. The main effect of the new Act is to modernize disaster preparedness and response mechanisms at both the municipal and provincial governmental levels. This is achieved by creating new administrative apparatuses and procedures as well as specifying more clearly the powers of the provincial government in times of disaster. In this introduction some of these more noteworthy features of the Act will be discussed in terms of how they depart from the Act's predecessor, and in terms of their sociological relevance and underpinnings.

One of the major provisions contained in the new Act is for the reorganization of disaster planning and response in Alberta. First, the Alberta Emergency Measures Organization of the old Civil Defence and Disaster Act is replaced by the Alberta Disaster Services Agency (A.D.S.A.), a department of the public service. What internal reorganization this may occasion was not yet clear at the time of this writing. However, it is clear that substantial changes will be forthcoming at the local level.

For instance, the new Act empowers the provincial cabinet minister responsible for A.D.S.A. to divide the province into various districts for the purpose of integrating emergency planning, training, etc. among the various political entities in each district. Furthermore, the Minister may require (rather than "allow," as in the previous legislation) that such integrated plans, procedures, and mutual aid programmes be formulated within those districts and submitted to the Director of A.D.S.A. for review. This is buttressed, under the new law, by the requirements that each local municipality must appoint an emergency plans and programmes advisory committee and must establish and maintain a municipal disaster services agency to be funded in part by the provincial government. Here again, the old legislation allowed, but did not require, this.

These clauses of the new Act rest on sound sociological foundations. Disasters and emergencies frequently strike without respect for existing political jurisdictional boundaries, as was the case with an hydrogen sulphide gas leak which occurred in central Alberta just before the passage of this Act. Sociological research has shown that such emergencies can only be responded to in an effective and efficient manner when the response plans of the different political jurisdictions have been coordinated in advance. It seems that the power to compel such planning and preparation is necessary to protect the citizens of municipalities and counties whose leaders adhere to the fallacy that "It (a disaster) can't happen here" or the equally dangerous fallacy that "You can't plan and prepare for disasters, because each one is different." Thus, compelling each municipality to have a Disaster Services Agency closely integrated with others in its district is merely facing up to sociological reality.

Consistent with the above shift to mandatory disaster planning is the new stipulation that persons involved in activities which are potentially hazardous to the larger community may be required to develop plans or programmes to remedy or alleviate the hazard and to respond to emergencies arising from the hazard.

Another administrative feature of the new Act is that it establishes an Emergency Contingency Fund to be built up by the provincial government for purposes of responding to disasters. Furthermore, the new Act formalizes the collection of donations from private citizens by establishing a Disaster Relief Fund. This fund, administered by a government appointed Disaster Relief Committee, can receive donations in response to a disaster inside or outside Alberta. These sections of the Act should have the effect of standardizing procedures which are often conducted on a very ad hoc basis elsewhere.

Still from an administrative standpoint, the Act provides A.D.S.A. with an important tool for carrying out the preventive aspects of its programme. Thus, the new Act allows A.D.S.A. to conduct public information programmes related to the prevention or mitigation of damage in disasters.

The new Act's shift in emphasis away from war emergencies is well illustrated in the sections dealing with the declaration of a state of emergency. The old Act, in language reminiscent of the federal War Measures Act, provided for the province to "declare that a state of emergency exists due to an actual or apprehended state of war, hostile enemy action or sabotage." The new, more open-ended Act, however, omits reference to the above terms and simply states that a state of emergency may be declared by the province, while leaving the

cabinet free to specify the precise nature of the emergency. This state of emergency automatically expires after two weeks, unless terminated earlier by the Minister or extended by the provincial legislature. The Minister is also empowered to cancel a state of emergency declared by any local authority in the province, although such local declarations expire after seven days anyway. This system of review by the legislature as a whole and by the minister may help to curb excesses by the cabinet or by over-zealous local authorities, respectively.*

Consistent with an Alberta government trend toward obtaining feedback from the public on proposed legislation, during the summer of 1973 the Disaster Services Act was discussed at public meetings across the province under the leadership of the Director of Alberta EMO. Attendance at these public consultation meetings was heavy and included persons from a wide variety of socio-economic backgrounds. Indeed, these meetings occasioned a close second look at the relationship between the proposed Act and the bill of human rights in Alberta, and some other changes were made in the Act on the basis of the public discussions.

At these meetings spirited discussion arose in conjunction with Section 16 of the Act, which lists actions which the Minister is empowered to take during a declared state of emergency. While it was recognized that Section 16 was inserted into the Act with the best of intentions for serving the citizenry well in the event of emergency or disaster, persons concerned with the civil liberties of individuals questioned such paragraphs as the one authorizing entry without warrant into any building by any person in the course of implementing an emergency plan.

Considerations of the political advisability of such provisions aside, two things are clear. First, this entire section of the Act, when responsibly used, provides a powerful and useful tool for the protection of life and property in disaster. And secondly, as it pertains to disasters (as opposed to war emergencies and sabotage) the new Act confers essentially no new powers on the Minister, when compared to the former Act. Thus, the former Act stipulated that "During the state of emergency [due to an actual or apprehended disaster] the Minister may do all acts and take all necessary and advisable proceedings relating to disasters. . ." (Sec. 9.3). Thus, the old and the new Acts are essentially the same here and the only real changes in the Act are that a few such "acts and procedures" of the Minister are specified (without excluding those which are not so illustrated), and these powers of the Minister are extended from the disaster situation to other types of declared emergency as well.

Despite personal reservations about certain paragraphs in Section 16, this reviewer's field experience with the Disaster Research Centre leads him to emphatically endorse the paragraph providing for compelled evacuation of persons in an area affected by a disaster. Most readers of this Digest are no doubt familiar with an almost universal complaint of disaster evacuation personnel to the effect that some people refused to evacuate in the face of impending danger. For instance, when Hurricane Camille struck the coast of Mississippi, thirteen persons who refused to evacuate and instead stayed behind to ride out the storm, were all killed when the storm struck their apartment. If the police had had the legal power to compel evacuation, as is now the case under the Alberta Disaster Services Act, those thirteen lives would have been saved.

Although this power is now at the disposal of the Alberta government, it should be borne in mind that people who refuse to evacuate do so not merely out of stupidity, but for specific social psychological and cultural reasons. For instance, their perception of the threat will likely differ from the perception of disaster officials; or their identification with their property may be so strong that they cannot bear to leave it at all [or at least until it is secure]; or evacuation may be defined in the male culture as an unmanly act and males will not wish to appear unmanly in front of their family or friends; or the elderly may adopt a fatalistic attitude toward danger posed by disaster; etc.)

And finally another virtue of the power to compel evacuation is that it obviates the need for evacuators to go back into the afflicted area under much more dangerous conditions (e.g., during the crest of a serious flood) to evacuate those who stayed behind but who later changed their mind. Thus, by granting the government power to compel evacuation, the new Act substitutes orderly evacuation in place of dangerous rescue during "impact" or time-consuming searching for victims post-impact.

These, then, are some of the highlights of the new Act to this reviewer. In concluding, it can be seen that the Act has substantially advanced the process of modernization of disaster preparedness and response in the Province of Alberta.

*The old Act also contained a more general clause providing for a state of emergency to be declared "due to an actual or apprehended disaster."

THE ACT

(Assented to October 30, 1973)

HER MAJESTY, by and with the advice and consent of the Legislative Assembly of Alberta, enacts as follows:

Definitions

1. In this Act,

(a) "Cabinet Committee" means the committee of the Executive Council appointed under section 4;

(b) "declaration of a state of emergency" means an order of the Lieutenant Governor in Council under section 15;

(c) "declaration of a state of local emer-

gency" means a resolution or order of a local authority under section 18;

(d) "Director" means the Director of the Alberta Disaster Services Agency;

(e) "disaster" means a calamity caused by accident, by an act of war or insurrection or by the forces of nature and which has resulted or may result in serious harm to the safety, health or welfare of people, or in widespread damage to property;

(f) "emergency" means a present or imminent event which requires prompt coordination of action or special regulation of persons or property to protect the health, safety or welfare of people or to limit damage to property;

(g) "local authority" means

(i) the council of a city, town, village, county or municipal district, or

(ii) the board of administrators of a new town, or

(iii) in the case of an improvement district or special area, the Minister of Municipal Affairs;

(h) "Minister" means the member of the Executive Council for the time being charged with the administration of this Act;

(i) "municipal agency" means a municipal disaster services agency;

(j) "municipality" means a city, town, new town, village, county, municipal district, improvement district or special area.

PART 1
ADMINISTRATION

Alberta Disaster Services Agency

2. There shall be a department of the public service of Alberta called the "Alberta Disaster Services Agency".

Personnel

3. In accordance with *The Public Service Act* there may be appointed a Director, Deputy Director and such officers and employees as may be required for the administration of the business and affairs of the Alberta Disaster Services Agency.

Cabinet committee

4. The Lieutenant Governor in Council may appoint a committee consisting of such members of the Executive Council as he may designate from time to time to advise on matters relating to emergencies and disasters.

Advisory committees

5. (1) The Minister may appoint committees as he considers necessary or desirable to advise or assist the Minister, the Cabinet Committee or the Director.

(2) The members of committees appointed under subsection (1) who are not officers or employees of the Crown, nor officers or employees of any agency of the Crown, may be paid remuneration for their services and expenses at a rate or rates fixed by the Minister.

Regulations

6. The Lieutenant Governor in Council may make regulations

(a) assigning responsibility to departments, boards, commissions or Crown agencies for the preparation or implementation of plans or arrangements or parts thereof to deal with emergencies;

(b) delegating to any person, board or committee appointed under this Act any of the powers vested by this Act in the Minister or the Lieutenant Governor in Council except the power to make an order for a declaration of a state of emergency or to make regulations;

(c) governing the assessment of damage or loss caused by a disaster and the payment of compensation for the damage or loss;

(d) governing the sharing of costs incurred by the Government of Alberta or by a local authority in conducting emergency operations;

(e) governing the payment of expenditures out of the Emergency Contingency Fund;

(f) governing the administration of the Disaster Relief Fund;

(g) concerning any other matter or thing necessary for the administration of this Act and for which no specific provision is made in this Act.

Powers and duties of Minister

7. (1) The Minister may

(a) review and approve or require the modification of provincial and municipal emergency plans and programs;

(b) enter into agreements with the Government of Canada or of any other province or any agency of such government, dealing with emergency plans and programs;

(c) make surveys and studies of resources and facilities to maintain and provide information necessary for the effective preparation of emergency plans and programs;

(d) make surveys and studies to identify and

record actual and potential hazards which may cause emergencies;

(e) make payments, subject to such terms and conditions as he may prescribe, to local authorities for the purpose of operating municipal disaster services agencies;

(f) enter into agreements with and make payments to organizations for the provision of services in the development or implementation of emergency plans or programs;

(g) conduct public information programs relating to the prevention of and mitigation of damage in disasters;

(h) delegate in writing to the Director any of the powers or duties vested in the Minister by this Act.

(2) The Minister may, by order,

(a) divide Alberta into various subdivisions for the purpose of organizing integrated emergency planning, training, assistance and emergency operations programs;

(b) require municipalities within a subdivision to prepare integrated plans, procedures and mutual assistance programs to deal with emergencies and their submission to the Director for review;

(c) establish procedures required for the prompt and efficient implementation of plans and programs to meet emergencies;

(d) require any person

(i) who is engaged or may be engaged in any operation, or

(ii) who is utilizing or may be utilizing any process, or

(iii) who is using any property in any manner, or

(iv) on whose real property there exists or may exist any condition,

which may be or may create a hazard to persons or property to develop plans and programs in conjunction with local authorities to remedy or alleviate the hazard and to meet any emergency which might arise from the hazard.

Municipal emergency organization

8. The local authority of each municipality

(a) shall appoint a committee of members of the local authority or, in the case of an improvement district or special area, of such persons as the Minister of Municipal Affairs may designate, to advise on the development of emergency plans and programs and shall fix the expenses of the committee members;

(b) shall establish and maintain a municipal disaster services agency;

(c) may, by by-law in the case of a municipality other than an improvement district or special area, borrow, levy, appropriate and expend, without the consent of the electors, all sums required for the operation of the municipal agency;

(d) shall appoint a director of the municipal agency and prescribe his duties which shall include the preparation and coordination of emergency plans and programs for the municipality;

(e) shall prepare and approve emergency plans and programs;

(f) may enter into agreements with and make payments to organizations for the provision of services in the development or implementation of emergency plans or programs.

Emergency Contingency Fund

9. (1) There is hereby established an Emergency Contingency Fund into which shall be paid money appropriated by the Legislature for that purpose and out of which shall be paid in accordance with the regulations expenditures relating to emergencies.

(2) If at any time it appears to the Lieutenant Governor in Council that there is in the Emergency Contingency Fund a cash surplus that is not immediately required for the purposes of this Act, the Lieutenant Governor in Council may order that the cash surplus be paid into and form part of the General Revenue Fund.

Disaster Relief Fund

10. (1) There is hereby established a Disaster Relief Fund into which may be received public donations for disaster relief in areas inside or outside Alberta.

(2) The Disaster Relief Fund shall be administered in accordance with the regulations by a committee called the "Disaster Relief Committee" consisting of such persons as may be appointed by the Lieutenant Governor in Council.

(3) Members of the Disaster Relief Committee who are not employees or officers of the Crown, nor officers or employees of an agency of the Crown, may receive remuneration for their services and expense allowances at such rate as may be fixed by the Lieutenant Governor in Council.

Recovery of expenditures

11. Where any expenditure with respect to a disaster is made by the Government of Alberta within or for the benefit of a municipality, the local authority shall, if so required by the Lieutenant Governor in Council, pay to the Provincial Treasurer the amount thereof or such portion thereof as may be specified in the order, at such times and on such terms

as to the payment of interest and otherwise as the order may require.

Protection from action

12. (1) Neither the Minister nor any official or other person acting under his direction or authorization is liable for damage caused through any action under this Act or the regulations, nor is he subject to any proceedings by way of prohibition, certiorari, mandamus or injunction.

(2) Notwithstanding subsection (1), the Minister or any official or other person acting under his direction or authorization is liable for neglect of duty or misuse of authority in carrying out his duties under this Act or the regulations.

Protection from action

13. If a state of emergency is declared to exist by the Government of Canada or by the Lieutenant Governor in Council or if a state of local emergency is declared to exist by a local authority,

(a) no member of a local authority, and

(b) no person appointed by a local authority to carry out measures relating to emergencies or disasters, is liable in respect of damage caused through any action taken under this Act or the regulations, nor are they subject to any proceedings by prohibition, certiorari, mandamus or injunction.

Offence

14. A person contravening a provision of this Act or the regulations is guilty of an offence and liable on summary conviction to imprisonment for a term of not more than six months or to a fine of not more than $500 or to both imprisonment and fine.

PART 2
STATE OF EMERGENCY

Declaration of state of emergency

15. (1) The Lieutenant Governor in Council may at any time when he is satisfied that an emergency exists or may exist, make an order for a declaration of a state or emergency relating to all or any part of Alberta.

(2) A declaration of a state of emergency under subsection (1) shall identify the nature of the emergency and the area of Alberta in which it exists.

(3) Immediately after the making of an order for a declaration of a state of emergency, the Minister shall cause the details of the declaration to be published by such means of communication as he considers is most likely to make known to the majority of the population of the area affected the contents of the declaration.

(4) An order under subsection (1) expires at the end of 14 days unless continued by a resolution of the Assembly.

Powers of Minister in emergency

16. (1) Upon the making of the declaration and for the duration of the state of emergency the Minister may do all acts and take all necessary proceedings including the following:

(a) cause any emergency plan or program to be put into operation;

(d) authorize or require a local authority to cause any emergency plan or program for the municipality to be put into effect;

(c) acquire or utilize any real or personal property considered necessary to prevent, combat or alleviate the effects of an emergency or disaster;

(d) authorize or require any qualified person to render aid of such type as he may be qualified to provide;

(e) control or prohibit travel to or from any area of Alberta;

(f) provide for the restoration of essential facilities and the distribution of essential supplies and provide, maintain and co-ordinate emergency medical, welfare and other essential services in any part of Alberta;

(g) cause the evacuation of persons and the removal of livestock and personal property from any area of Alberta which is or may be affected by a disaster and make arrangements for the adequate care and protection of those persons or livestock and of the personal property;

(h) authorize the entry into any building or upon any land, without warrant, by any person in the course of implementing any emergency plan or program;

(i) cause the demolition or removal of any trees, structures or crops if the demolition or removal is necessary or appropriate in order to reach the scene of a disaster, or to attempt to forestall its occurrence or to combat its progress;

(j) procure or fix prices for food, clothing, fuel, equipment, medical supplies, or other essential supplies and the use of any property, services, resources or equipment within any part of Alberta for the duration of the state of emergency;

(k) authorize the conscription of persons needed to meet an emergency.

(2) Where the Minister acquires or utilizes any real or personal property under subsection (1) or where any real or personal property is damaged or destroyed due to an action of the Minister in preventing, combatting or alleviating the effects of an emergency or disaster, the Minister shall cause compensation to be paid therefor.

(3) The Lieutenant Governor in Council may make regulations in respect of any matter mentioned in subsection (1).

(4) Upon the making of an order under section 15, subsection (1), the Director or such other person as the Minister may appoint is responsible for the co-ordination and implementation of any or all necessary plans or programs prepared pursuant to this Act and all persons and agencies involved in such implementation are subject to the control and direction of the Director or other person appointed.

Termination of state of emergency

17. (1) When, in the opinion of the Lieutenant Governor in Council, an emergency no longer exists in any area of Alberta in relation to which a declaration of a state of emergency was made, he shall make an order terminating the declaration of a state of emergency in respect of that area.

(2) Immediately after an order is made under subsection (1), the Minister shall cause the details of the termination to be published by such means of communication as he considers is most likely to make known to the majority of the population of the area affected the contents of the termination order.

Declaration of state of local emergency

18. (1) The local authority of a municipality may, at any time when it is satisfied that an emergency exists or may exist, by resolution or, in the case of the Minister of Municipal Affairs, by order make a declaration of a state of local emergency relating to all or any part of the municipality.

(2) A declaration of a state of local emergency under subsection (1) shall identify the nature of the emergency and the area of the municipality in which it exists.

(3) Immediately after the making of a resolution for a declaration of a state of local emergency, the local authority shall cause the details of the declaration to be published by such means of communication as it considers is most likely to make known to the population of the area of the municipality affected the contents of the declaration.

(4) A local authority may delegate any of its powers and duties under this Act to a committee composed of members of the local authority.

Cancellation of declaration of state of local emergency

19. (1) The local authority shall forthwith upon making a declaration of a state of local emergency, forward a copy of the declaration to the Minister.

(2) The Minister may cancel the declaration of a state of local emergency at any time he considers appropriate in the circumstances.

(3) A declaration of a state of local emergency ceases to be of any force or effect upon the making of an order for a state of emergency by the Lieutenant Governor in Council relating to the same area of the municipality.

(4) A declaration of a state of local emergency lapses seven days after its making by the local authority unless it is earlier cancelled by the Minister or terminated by the local authority or unless it is renewed by the local authority.

(5) The provisions of section 18, subsection (3) and of subsections (1) to (4) of this section apply to any renewal of a state of local emergency.

Termination of declaration of state of local emergency

20. (1) When, in the opinion of the local authority, an emergency no longer exists in any area of the municipality in relation to which a declaration of a state of local emergency was made, it shall by resolution or, in the case of the Minister of Municipal Affairs by order, terminate the declaration of a state of local emergency in respect of that area.

(2) Immediately after

(a) the passage of a resolution or order terminating a declaration under subsection (1), or

(b) the cancellation by the Minister of a declaration of a state of local emergency, or

(c) the termination by lapse of time of a declaration of a state of local emergency,

the local authority shall cause the details of the declaration or cancellation or the fact of the termination by lapse of time to be published by such means of communication as it considers is most likely to make known to the majority of the population of the area affected the contents of the declaration or cancellation or the fact of the termination.

Powers of local authority

21. (1) Upon the making of a declaration of a state of local emergency and for the duration of the state of local emergency, the local authority may do all acts and take all necessary proceedings including the following:

(a) cause any emergency plan or program to be put into operation;

(b) exercise any power given to the Minister

(continued on page 15) **THE DISASTER**

ALBERTA OIL WELL EXPLOSION

Report by

Alberta Disaster Services
Edmonton, Alberta

15 November 1973

Summary

During the afternoon of Tuesday, 2 October 1973, servicing operations were in progress at an oil well located 5 miles west of Ferintosh, Alberta. The well, operated by Sun Oil Company, had been idle for several years, and the servicing work was preparatory to returning the well to production.

At approximately 3:45 p.m. the well suddenly erupted, hurling lengths of well pipe into the air and damaging surface apparatus, and commenced to spout a 200-foot high column of water, some crude oil, and substantial amounts of "sour gas" (natural gas with a content of Hydrogen Sulfide (H_2S), a highly toxic, potentially lethal substance).

The H_2S content was estimated at 5%. Because of the hazard to life, such emissions are normally ignited and burned at the source; however, in this case burning was rendered impractical by the spouting water. The damage to well head apparatus made control impossible without special equipment, and it was accordingly determined that the well must be left to erupt until the appropriate control resources could be assembled and employed.

Thus for some 26 hours subsequent to the eruption the well spewed sour gas, which soon began to form visible "gas clouds" drifting to the north-east with the wind. In the absence of factual contrary information, the clouds were assumed lethal; consequently, during the night of 2 - 3 October residents of nearby communities and farmsteads were warned to evacuate, and moved to safety at Camrose, Wetaskiwin, and Stettler.

By dawn Wednesday, 3 October it became apparent that the gas clouds were not lethal as anticipated, and some residents returned to tend to farm animals, and other essential chores. At 6:00 p.m. the wild well had been successfully capped, and all evacuees had returned to their homes.

Scope of Report

This report is primarily concerned with the emergency evacuation and measures adopted in view of the apparent hazard to life. Scientific and technical aspects of the accidental release are not discussed; a comprehensive evaluation of these aspects will be available from reports expected to follow a formal inquiry, now in progress, into the cause and effects of the well eruption and subsequent discharge.

Initial Warnings

Initial warnings of the H_2S threat were passed by the oil company to the Bashaw RCMP Detachment, which promptly notified other Detachments affected and the controlling RCMP Sub-Division Headquarters at Red Deer.

Threat Developments

By 6:30 p.m. the escaping gas had accumulated as a large cloud extending north-east from the well site; the cloud was readily visible, and was estimated to be advancing at approximately 100 yards per minute. By 8:00 p.m. the New Norway area was threatened, and RCMP patrols began warning residents to evacuate to the north. The cloud continued to advance northward; by 9:00 p.m. it was well north of New Norway and was expected to drift into and follow the Battle River valley, and residents of Gwynne, Bittern Lakes, and surrounding farmsteads were warned to evacuate. By 10:00 p.m. the gas cloud was within a mile of and threatening Camrose; but by midnight a shift to westerly winds began to take effect, and the gas began to drift south-eastwards, roughly following the Battle River — Driedmeat Lakes depression. By 4:00 a.m. Wednesday the Edberg area was threatened, and some residents of that community moved to safety at Stettler, to the south. Meanwhile, residents of Ferintosh, the community nearest the wild well, had been warned and prepared to evacuate at any time; but the increasing westerly winds carried the gas clouds over Ferintosh, to settle in the area to the east of the village.

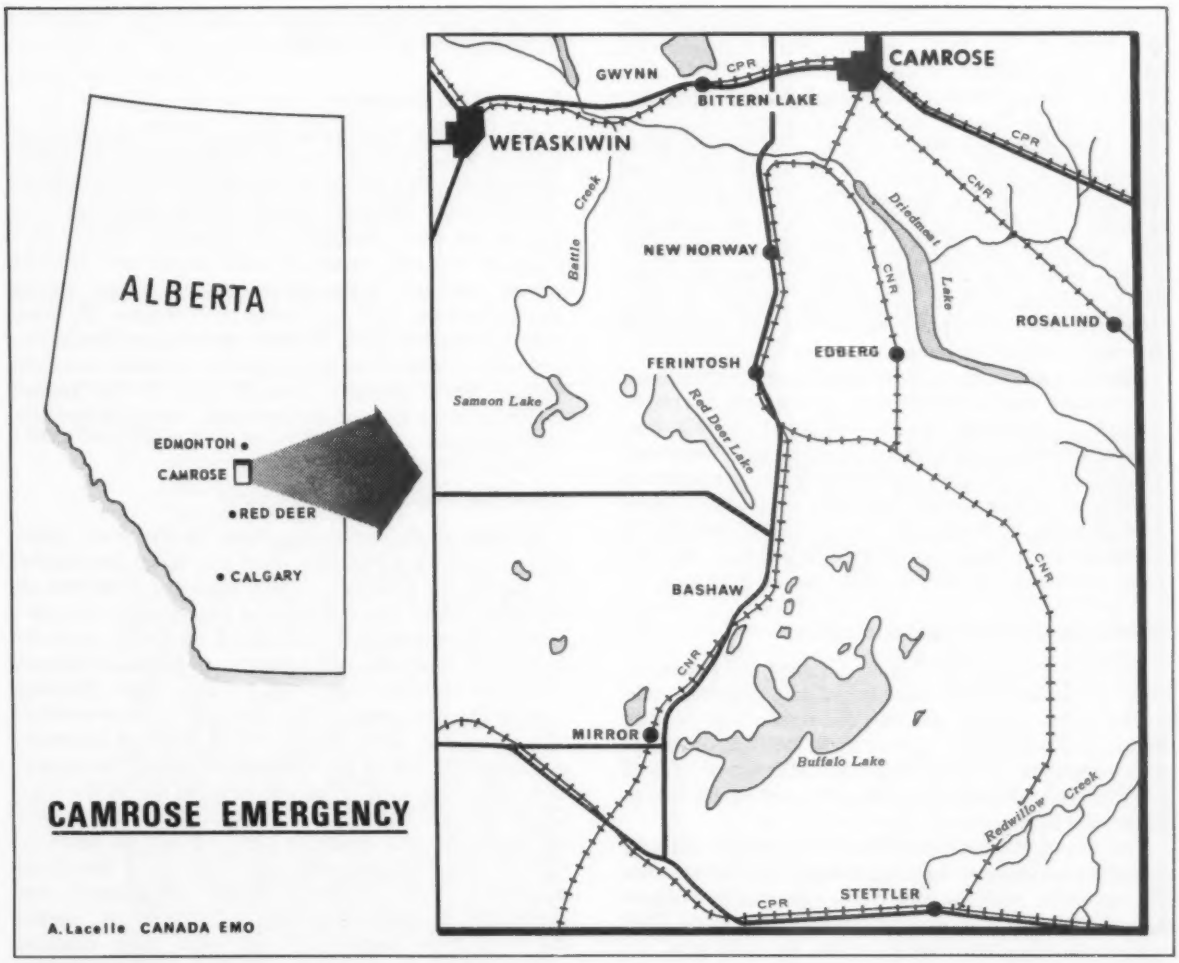
Situation and Evacuation Notices

RCMP patrols covering the affected area were the principal source of first evacuation warnings to residents. However, radio station CFCW at Camrose, upon learning of the situation, promptly set up remote broadcasting facilities at the Camrose emergency control headquarters, and throughout the night broadcast timely, factual situation and evacuation information for the benefit of area listeners.

Provincial Government Activities

Government of Alberta organizations directly involved with the well discharge reacted according to plan.

Soon after notice of the eruption the Energy Resources Conservation Board (ERCB) had 5 field personnel in the well area, gathering technical information and coordinating with specialists regarding efforts to bring the well under control. Later the ERCB field force grew to seven, two at the well site and five others patrolling and advising farmers near the well site. In addition to their



expertise, these ERCB specialists also brought their H_2S detection equipment and protective devices for use in the affected area.

By 8:00 p.m. Tuesday, Alberta Environment also had specialists and equipment in the area. Between that time and 2:00 a.m. Wednesday, two Environment men set up H_2S detection and measuring equipment across the line of gas cloud advance northward; in the early hours of the morning they were joined by six more field specialists and more equipment; and by 10:00 a.m. the Environment field staff involved numbered ten men, complete with mobile equipment, portable detectors (or "sniffers"), and meteorological instruments. This field force operated at times within one mile of the wild well, finally ceasing operations at 5:00 p.m. Thursday, when sufficient pollution data had been recovered. The maximum H_2S reading recorded by the field force on their "sniffers" was .02 parts per million (ppm); however, it was estimated that a concentration of 5 to 10 ppm was present at some locations, with one reading of 50 ppm about 1½ miles from the well head.

Meanwhile, Alberta EMO had also reacted accordingly. The Director of Alberta EMO dispatched his Deputy to Camrose to provide guidance as to Government assistance and help with municipal emergency evacuation planning, then implemented a Headquarters Operations Section to monitor the situation, provide a focal point for inquiries as to Government departments and agencies other than Environment and the ERCB, committed to field operations. The Headquarters Operations Section remained functional until 7:00 p.m. Wednesday, when it was apparent that the threat was over. Alberta EMO passed advisory notices for the Regional Director, Canada Emergency Measures Organization, and kept local Canadian Forces briefed on the situation.

The Director ensured that the Minister-in-Charge, Dr. Horner, was advised of each development. By 11:00 p.m. Tuesday Dr. Horner felt that he and his colleagues directly involved should proceed to the area for a first-hand evaluation of the situation. Alberta EMO arranged for an aircraft, and at 1:30 a.m. Wednesday the official party, headed by Dr. Horner, the Minister of Environ-

ment Mr. Yurko, and the Minister of Consumer Affairs, Mr. Dowling, and including the Director of Alberta EMO, Chief Superintendent Peterson of RCMP "K" Division Headquarters, and Mr. Milliken, Executive Assistant to the Premier, arrived at Camrose. There they were briefed by Environment and ERCB field force leaders and by representatives of the oil company, and then proceeded to the threatened area for an on-scene evaluation. By 5:00 a.m. Wednesday they had completed their survey and, assured that all possible measures were in hand, returned to Edmonton. The Director of Alberta EMO remained behind, conducting further inquiries respecting evacuation planning, and he and his Deputy returned to Edmonton later Wednesday morning.

Alberta Government Telephones were instrumental in providing special emergency government telephone facilities at Camrose. Three additional EGHQ telephones, requested at 9:45 p.m. Tuesday, were functional by 10:30 p.m.; and five more telephones requested at 11:00 p.m. were installed by midnight. In the early hours of Wednesday, a direct line from the City's emergency headquarters to the local RCMP Detachment was requested and installed within a half-hour, at 3:45 a.m.

Municipal Government Activities

Between 6:30 and 8:00 p.m. Tuesday the municipal EMO Co-ordinators involved could only determine that an H_2S threat existed, and that the reason was the well discharge. By 8:00 p.m., however, RCMP patrols began evacuating New Norway, and the EMO Co-ordinators in Wetaskiwin and Camrose were warned by RCMP to prepare for evacuees.

The Camrose EMO Co-ordinator promptly initiated procedures to activate the city's Emergency Government Headquarters, and for the city's Emergency Welfare Services to set up an evacuee reception centre in the Drill Hall on the Camrose Fair Grounds. By 9:00 p.m. the EGHQ and evacuee reception centre were fully operational, with the Mayor, members of Council, and emergency service chiefs all present and functioning. The EGHQ was operational for approximately 21 hours; operationally active from 8:00 p.m. Tuesday until 11:00 a.m. Wednesday, then on standby until final shut-down at 5:00 p.m. on Wednesday afternoon. During this period, the Camrose EGHQ received and registered some 200-odd evacuees, stood by to receive any others, and developed comprehensive evacuation plans for use should the city's residents be threatened by the nearby gas cloud.

The Wetaskiwin E.G. Area Co-ordinator, upon being alerted, similarly implemented actions for the reception and care of evacuees. However, since the city was not directly threatened as was Camrose, evacuee care activities only were featured. Accompanied by the Mayor of Wetaskiwin, the Co-ordinator assembled emergency welfare staff and others to the Civic Centre, which was used as an evacuee reception point throughout the emergency period. As of 1:00 a.m. Wednesday, some 300-odd evacuees had been registered and cared for by this Centre; at that time the staff were placed on standby and returned to their homes, subject to recall (to be relayed through Wetaskiwin RCMP) if required.

Evacuation Summary

By midnight Tuesday an estimated 800 persons had left their homes at New Norway, Gwynne, Bittern Lakes, and nearby farms. Some 300 had registered at the Wetaskiwin evacuee reception centre, and an estimated 200-odd others were thought to be elsewhere in the city. Camrose evacuee reception staff registered 200-odd persons, and again it was estimated that an equal number had arrived but had not bothered to register. By 5:00 a.m. Wednesday some 50 Edberg residents decided to evacuate in view of the warnings and proceeded south to Stettler, where thanks to prompt action by the Stettler EMO Co-ordinator and his assistants, reception facilities were available.

Camrose Evacuation Planning

In light of the continuing threat to Camrose, emergency evacuation planning there continued throughout the night. The Camrose County Manager contacted all available school bus drivers and bus maintenance personnel; they proceeded to ready all available buses for evacuation if needed, and a number of additional drivers were also obtained from local trucking firms. Planning was initiated for removal by helicopter of non-ambulatory patients of active treatment and auxiliary hospitals, and assembly points for evacuees requiring transportation were designated. Planning included use of the local DND Attack Warning sirens under local control to alert the citizenry; and residents were advised to listen to CFCW radio for evacuation instructions, if the sirens were heard. The Camrose RCMP Detachment was designated as evacuation control headquarters, should the need arise, because of the police radio contacts available there. In the ultimate event none of these preparatory measures were required; however, some invaluable experience was gained in considering all the exigencies possible.

Special Evacuation Planning — Hospital Patients

With the prospect of total evacuation looming, arrangements for the removal and care of Camrose hospital patients became a priority concern. By midnight Tuesday the Alberta Health and Social Development Director of Institutions was able to report that the Alberta Hospitals at Ponoka and Oliver had been alerted and were prepared to receive patients evacuated from Camrose. Emergency Measures Co-ordinators for the Town of Ponoka and the Ponoka Emergency Government Area were also alerted and participated in local planning for patient transfer and reception.

Canadian Forces Involvement

By late Tuesday evening the Camrose evacuation outlook raised the possibility of Canadian Forces in-

volvement. The Director Alberta EMO accordingly contacted the designated military Duty Officer and alerted him to the situation.

On 3 October, in response to a request from Alberta Agriculture, Alberta EMO queried Canadian Forces regarding the availability of respirators for use in H_2S contaminated areas. However, these were not needed and Agriculture requirements were ultimately satisfied from commercial sources in Edmonton.

Royal Canadian Mounted Police

RCMP Detachments involved performed their evacuation warning patrols and policing of evacuated areas in an exemplary manner.

Financial Arrangements

At the time of writing this report it is understood that the oil company operating the well, Sun Oil Limited, is prepared to assume responsibility for costs incurred by municipalities for emergency government headquarters operations and evacuee reception and care; the municipalities concerned have been so advised by Alberta EMO.

Provincial Government costs incurred under Alberta EMO purview have been charged against the Emergency Contingency Fund. ▲

THE DISASTER *(continued from page 11)*

under section 16, subsection (1) in relation to the part of the municipality affected by the declaration.

(2) A local authority may authorize any person at any time to exercise, in the operation of an emergency plan or program, any power given to the Minister under section 16, subsection (1) in relation to any part of the municipality affected by a declaration of a state of local emergency.

(3) The local authority of a municipality other than an improvement district or special area may, during or within 60 days after the state of local emergency, by by-law approved by the Minister of Municipal Affairs and, where necessary, by the Local Authorities Board, but without obtaining the assent of proprietary electors, borrow such sums as are necessary to pay expenses caused by the emergency including payment for services provided by the Government of Alberta or by the Government of Canada where the services were provided at the request of the local authority.

(4) In the case of an improvement district or special area, the Minister of Municipal Affairs may, during or within 60 days after the state of local emergency, borrow such sums as are necessary to pay expenses caused by the emergency including payment for services provided by the Government of Alberta or by the Government of Canada where the services were provided at the request of the Minister of Municipal Affairs.

Dispute re compensation

22. Where any dispute arises concerning the amount of compensation payable under this Act, the matter shall be determined by arbitration and the provisions of *The Arbitration Act* apply.

Acts amended

23. (1) *The Municipal Election Act is amended as to section 11, subsection (2), clause (g) by adding after the words "The Civil Defence and Disaster Act" the words* "or *The Disaster Services Act*".

(2) *The Municipal Government Act* is amended

(a) as to section 29, subsection (2), clause (g) by adding after the words "The Civil Defence and Disaster Act" the words "or *The Disaster Services Act,", and*

(b) by striking out section 153.

Repeal

24. *The Civil Defence and Disaster Act* is hereby repealed.

Coming into force

25. This Act comes into force on the day upon which it is assented to. ▲

HOME HEATING DURING MAJOR POWER FAILURES

by
William Johnston
Program Analyst, Treasury Board
(Formerly Chief, National Program Evaluation,
Canada Emergency Measures Organization)

The power failure of November 1965 which covered much of Eastern Canada and Eastern United States demonstrated the dependence of home heating systems on a continuing supply of electric power. While the probability of such a major power failure occurring again is small, the consequence of loss of power for extended periods during winter is sufficiently serious to warrant consideration of techniques for reducing the effects of heating loss by means of alternative heat or standby electric power.

The most important consideration in selecting a means of standby heating or power must be safety. There are two hazards which arise from the use of any fuel-burning appliance. The first is the danger of carbon dioxide and carbon monoxide poisoning. The second hazard is high surface temperatures which may cause ignition of other materials.

The problems of noxious fumes and high temperatures are dealt with safely in ordinary gas, oil, coal and wood furnaces and stoves by the use of a flue for venting combustion gases and by the use of an insulated firepot with an external jacket which does not become dangerously hot. The use of heating appliances without these features is dangerous and cannot be recommended.

There are, however, a number of alternatives which a homeowner can safely use during a power failure. Some of these techniques require little advance preparation while others require a considerable investment. These techniques include home protection against low temperatures, the provision of a standby heating system, and the provision of standby electric power.

Home Protection Against Low Temperatures

In cold weather a normal residence with the doors and windows tightly closed will require hours for its temperature to drop below freezing. Power failures rarely last longer than a few hours and therefore little or no action by the homeowner is necessary for the comfort of occupants or for the protection of the house. It is possible to protect a house from the effects of low temperature through the use of a few protective measures which can be carried out by the homeowner after the power failure has occurred.

If the power failure is to be prolonged, broadcast stations with emergency power facilities and a battery operated radio will, in most areas, give advice. In any event, when the house temperature starts dropping noticeably, the following actions should be taken while the temperature of the house is still above freezing. The electric power or gas supply to the water heater should be turned off. The water supply should be turned off at the meter, or if the water supply is a private well, at the pump. Inlet pipes should be protected by blankets or other insulating material. All of the valves in the house should be opened. Air will enter the highest valves and water will drain from the lowest valves. If the residence has its own water supply and pump, the pump and pressure tank should also be drained in accordance with the manufacturer's directions.

Water-consuming appliances, such as dishwashers and automatic washing machines should be disconnected and drained. Laying the drain hoses on the floor or in a low basin will allow most of the water to escape from most machines. The design of some machines may require special draining procedures. Homes heated by hot water or steam also require special draining precautions, not within the scope of this paper.

Toilets should be flushed until all of the tank water has passed into the bowl and down the drains. It is not desirable to empty the bowl of the toilet so completely that the seal provided by water in the bowl against the entry of sewer gases is broken. The toilet bowl may be protected against freezing by mixing ethylene glycol with the water in the bowl or by displacing the water with kerosene. A gallon or two of either ethylene glycol or kerosene should be acquired for this purpose. The storage of kerosene in the home may affect insurance coverage and the homeowner is advised to discuss this with the insurer. If neither antifreeze nor kerosene is available, adding a pound of salt to the water trapped in the bowl may protect it against temperatures of about 20°F. Drain traps of each sink in the house should be treated in the same manner using antifreeze, kerosene or salt.

The house itself will suffer little from temperatures below freezing. However, a reduction in temperature causes an increase in relative humidity and it is to be expected that the house will feel damper as the temperature drops. This dampness will not be a problem for a short time but during a longer period some evidence of mildew or warping may occur.

If the power failure is extended it may be necessary to move into a warm building. If this happens it will be essential to cut off power to those appliances which on restoration of electric services could create hazards in an unoccupied residence. If the power failure is extended, continuing efforts should be made to learn when power has been restored so that electric and water systems can be again connected.

When power is restored and the house heating system is again operative, the water system can be filled. Lower faucets on the water system should be closed and the

water supply turned on to allow the system to fill up. One or two upper taps should be left open until all air trapped in the pipes is released. All air must be vented from the water heater before its heating elements are turned on. Toilets and sink drains should be flushed to get rid of anti-freeze, kerosene or salt solutions.

Standby Heating

Standby heating systems constitute the most useful means for homeowners to reduce the consequences of extended power failures. The dangers involved in non-vented appliances which may also have dangerously high surface temperatures have already been mentioned and the only technique which can be safely recommended is the use of vented heating appliances with heat protective shells.

The first such heating appliance is the ordinary fireplace, particularly if there is one in the basement and one on the first floor as well. Although it may not be comfortable, a house may be kept from freezing for an extended period if sufficient fuel is available.

A more efficient solution may be achieved by providing a standby heating system which does not depend on electricity for its operation and which meets safety criteria. Space heaters and cook stoves burning a variety of fuels and which meet Underwriters Laboratories or Canadian Standards Association tests are best suited for emergency heating and should be installed near an existing flue. In most parts of the country, it is possible to buy at reasonable cost used stoves or space heaters which will perform adequately and safely as standby heating systems. If an unused flue is available, the unit may be connected permanently, but if one is not available in the chimney, stove-pipes with appropriate adapters should be obtained so that the unit may be connected to the flue normally used by the main furnace. Use of this installation, during a power failure necessitates disconnection of power to the main furnace to prevent an accidental start should electricity be restored unexpectedly. A properly vented standby heating system should keep the immediate area reasonably comfortable and prevent the remainder of the house from freezing.

In selecting a unit, it is important that it does not require the use of an electric circulating fan or electric ignition as these characteristics would make it useless in time of need.

The selection of fuel for the standby heating system is important. If a unit which burns wood or coal is selected, then obviously a supply of appropriate fuel must be at hand. If the house has a fireplace and considerable quantities of either wood or coal are available, then such a unit will prove satisfactory. However, as most homeowners do not store large quantities of wood or coal it may be desirable to consider units which use the same fuel as the main heating plant. Oil-burning space heaters and stoves are available. Though these stoves will work with furnace oil, it must be pointed out that furnace oil is heavier and combustion will tend to produce more soot than usual. This "sooting" may in time produce a secondary chimney fire hazard but by maintaining the stove at a reasonable high setting, medium to high, this hazard should not arise for several days. If the furnace oil tank is inside the basement, and therefore at or near room temperature, less soot will be produced. However, if the tank is outside or very cold, then the heating unit may require more attention to ensure satisfactory operation. If an oil unit is selected, it may be connected permanently into the main oil supply. Such a connection should be made by a qualified serviceman from the oil supplier or a competent tradesman. Since many fuel control valves for gravity oil stoves tend to leak when under pressure for extended periods, it is a requirement to place a shut-off valve in the standby unit's fuel line.

If gas is the normal furnace fuel, a standby heating system employing this fuel can be purchased and installed. The probability of failure in gas service is very small and is not likely to occur at the same time as the loss of electricity. It is important that installation of gas connections be made by a competent qualified servicemen. If there is separate flue for the emergency heating unit, then the pilot light may be lit if desired so that the heater is ready for immediate use. If no flue is available, then the heater may be connected when required to the flue used by the regular heating plant. In this case, the pilot light should be lit only after the flue is connected and main furnace turned off.

A reasonably inexpensive emergency or standby installation of either gas or oil fed heaters will maintain personal comfort and protect the rest of the house from freezing.

Other Techniques for Standby Heating Systems

Many householders will be aware that the burner of a gas furnace does not use an electric blower. The burner on a gas furnace and its controls have a relatively small power requirement which is generally self-activated by means of a thermopile in the pilot flame which converts heat energy directly into electrical energy. These controls will operate without modification in a power failure. Some other gas burner-controls use a small current of electricity at 110 Volts AC, from the house electrical system and therefore these controls will not work during a power failure. Such controls may be powered by an inverter which changes 12 Volts DC, from an automobile battery to 110 Volts AC. An inverter supplying 40 to 50 watts costs less than $50 and in an emergency the battery from an automobile would provide adequate energy for many hours. A gas furnace will operate until the heating chamber reaches its safe maximum temperature and then the high limit thermostat in the chamber will turn the furnace off until the chamber cools enough so that the cycle can be repeated. While from the gas supplier should be sought by the householder before attempting to use this technique, if the control system can be energized, the furnace may be operated as a gravity flow unit by removing the filter and fan access cover to increase air circulation

through the system. Removing the warm air ducts will increase the heat output to a basement although this practise is not recommended. The inverter, if necessary, should be installed by a competent service man.

Provision of Standby Electric Power

The ultimate answer to the loss of electric power is a standby power system capable of operating the furnace and a number of selected electrical appliances and circuits, such as the refrigerator and freezer and a few essential lights, or alternatively one which will power the complete electrical system of the house. Electric generators to power any part or all of the electrical system of any house or commercial building are available in a variety of sizes. The generators may be driven by gasoline engines, by engines modified to burn natural or liquefied petroleum gases or by diesel engines. The engine may be air-cooled or water-cooled. A 1500 watt gasoline-powered electric generator adequate to drive the furnace and blower in a normal house is available for about $500, not installed. A gasoline-powered generator large enough to drive the furnace and blower and other essential appliances such as the refrigerator and freezer and a few lights is available for $200 to $300 more. Generators driven by engines powered by natural or liquefied petroleum gases are more expensive than gasoline driven generators while those driven by diesel engines are still more expensive. Engine-driven generators which will provide the full electrical requirement for a residence are available for each fuel. A generator with such a high output and automatic controls may cost several thousand dollars installed.

The homeowner must consider the fuel used by the generator engine and two problems are involved. First, the storage of fuel may introduce a fire hazard which may directly affect insurance coverage. Gasoline may evaporate and potentially explosive fumes may accumulate in the adjacent area. Diesel fuel is much less volatile, and therefore, much safer. The liquefied petroleum gases, propane or butane, must be stored in high pressure cylinders, which generally have excellent shut off valves and there is little danger of vapor being carried into the surrounding air once the shut off valve has been closed. The selection of fuel and its manner of storage should be discussed by the homeowner with his insurer.

In addition to ensuring safety of fuel its deterioration in storage must be considered. Most homeowners will recall the problem of starting a lawnmower or outboard motor which has not been used for some months. A gun forms in gasoline in storage which can be exceedingly troublesome to carburetors. Diesel fuel deteriorates slowly in storage and, with the use of a fuel conditioner available from heating or automotive stores, has a very long life. Some industrial diesel engines will burn furnace oil, but diesel engines used on small generators may not utilize furnace oil successfully. The liquefied petroleum gases have an indefinite storage life and will give no problems over extended periods. If liquefied petroleum gas is selected as the fuel for the generator engine, it is possible to connect and use replaceable cylinders such as used extensively by campers, cottagers, tradesman and farmers.

If natural gas is available, the generator engine may be permanently connected into the gas supply but such an installation must be made by the supplier.

An engine in operation creates considerable heat which is dissipated either through a radiator, if water-cooled, or directly if air-cooled. The location selected for the motor and generator must take cognizance of this fact. Usually a good location for a generator is the garage. The heat created by the engine will warm the garage but unless the engine is a large one, the garage should not become overheated during operation. If overheating becomes a problem, the garage door may be partly or fully opened to privide adequate air flow. Permanent installation of larger units should include a cooling air duct to vent heat and fumes from the garage while the generator is operating.

It is important that the exhaust gases from any unit be adequately vented outside of the building and, for the sake of the neighbours, the exhaust system should be properly muffled. While it is possible to install the generator system safely in an unoccupied portion of the basement of a house, it should be remembered that, in addition to odors which the engine may produce, there may be danger from leakage of the exhaust system. It should also be remembered that the exhaust system will become exceedingly hot and it will be necessary to provide an insulated passage through walls.

Workmen repairing damaged power lines may be electrocuted by the power produced by improperly connected emergency electrical systems. It is therefore absolutely essential that a safety device be provided in the system to prevent this occurrence. The cheapest satisfactory means of providing this safety is the use of a double-throw switch which allows the homeowner to choose between alternative sources of power for his installation. When electrical power is available, the switch will be in its normal position to allow electric power from the mains to power the furnace, blower and whatever other circuits are selected for the emergency system. In the event of a power failure, the homeowner starts his engine-driven generator and moves the switch from the normal position to the emergency position which connects his furnace, blower and other selected circuits to his engine-driven generator.

Transfer panels may be used to provide automatic provision of power to emergency circuits. Transfer panels are made up of double-throw switches with automatic controls which will start the engine-driven generator and connect it to the emergency circuits. They are completely safe in all respects. They cost from a few hundred to a few thousand dollars depending on capacity and on a variety of optional features. Homeowners desiring this level of protection are urged to consult a professional electrical engineer.

Because of the hazards involved in electrical modifications it is strongly recommended that the homeowner contact a competent contractor to install the standby system. Such firms can supply all of the necessary equipment, including heaters, fuel supply, generators, transfer switches and safety controls. The contractor will also be able to recommend the size of the unit which should be purchased.

Refrigerators and Freezers

A source of concern to many householders in a power failure is the safety of food in a freezer. A fully loaded freezer represents a large financial investment and the risk of food poisoning from refrozen food deserves this concern.

The best solution is to include the refrigerator and freezer on emergency circuits powered by a standby power system. However, the freezer and refrigerator have good insulation and most of the heat entering these appliances comes in through the open door. Consequently, keeping the refrigerator and freezer doors closed will do much to maintain low temperatures. A maximum temperature thermometer, which is available in hardware stores, placed in the freezer will give a good indication of the safety of the contents.

Conclusion

Because of the severity of Canadian weather, the possibility of an extended power failure, while remote, is a threat to Canadian homeowners. Adequate precautions can minimize or eliminate this risk. Houses can be protected against effects of low temperature for extended periods after power has gone off. There are safe units and techniques for relatively inexpensive standby heating units. Electric power to the furnace and other emergency circuits including circuits for the refrigerator and the freezer can be installed for use in an emergency. ▲

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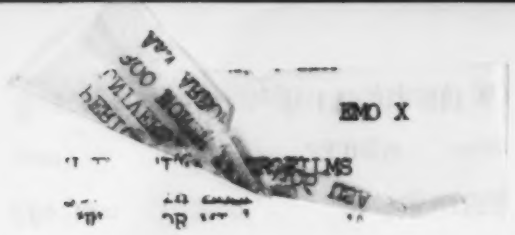

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